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PowerHour FAQs

Generator Set Overcurrent Protection

Recently, a lot of attention has been paid to selective coordination and protection requirements for facility cabling and distribution systems. But generator sets have unique characteristics that affect reliability and which need to be considered. This discussion will explore and explain some of these properties.

To learn more about overcurrent protection, join the Cummins PowerHour webinar:

Following this PowerHour participants should be able to:

- Define generator excitation systems and their effect on fault current performance
- Identify basic generator set overcurrent protection requirements and specify the correct protection equipment
- Describe the NEC requirements for selective coordination, generator disconnect, arc flash energy reduction and separation of circuits, and evaluate different means for achieving compliance
- Identify recent important codes changes to NFPA70 NEC 2017 and their impact on generator set protection

How are AmpSentry overcurrent settings programmed in the controls?

AmpSentry is a Cummins protective relay that's incorporated into Cummins controls with that feature. The AmpSentry settings are fixed at the factory, based on the generator set's ratings, specifically amps with a full load. The customer doesn't have to do anything—the AmpSentry is pre-set. If you need to adjust the time current curve to increase the amount of protection, you can add additional time, but you can't lower the setting.

How is the Cummins PCC maintenance mode enabled onsite?

PowerCommand controls (PCC) maintenance mode can be activated in two ways. You can program a configurable input for maintenance mode, for example, an external switch that has been programmed to turn arc flash maintenance mode on and off.

Also, maintenance mode is automatically enable when a service technician connects a computer with Cummins Inpower software to the service port.

Which Cummins controls include maintenance modes?

Some Cummins PowerCommand controls have an arc energy reduction mechanism. Specifically, this feature is included in 2.X and 3.X models. So if you select a generator set with PCC 2300 or PCC 3300 controls, it will have the maintenance mode feature that can be operated from an external switch.

Is ETAP included in the list of software programs that have AmpSentry?

ETAP does not include AmpSentry, but if you're using ETAP, you can enter the AmpSentry parameters manually. The AmpSentry basically has two parts—the time current curve for overcurrent protection and the decrement curve that regulates fault current of 300%. There's a Cummins white paper that explains how to set up AmpSentry manually using SKM showing the decrement curve with field current forcing and the time current curve. The same concept can be applied to ETAP or other software.

Can you adjust the inherent overcurrent protection to protect the conductors?

Yes, you can increase the overcurrent protection, but assuming the conductors and cables are sized appropriately to handle the full current load of the generator set, the AmpSentry provides sufficient protection and does not need to be adjusted. AmpSentry is approved for overprotection by UL and the NEC (National Electrical Code). To make it trip faster, you can adjust the AmpSentry by moving the time current curve to the left. But if you have smaller cables you may need approval from the AHJ. You cannot adjust AmpSentry to make it trip slower.

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If the generator set is connected to three-cycle rated electrical equipment, does AmpSentry provide instantaneous protection? And, does the PowerCommand control protect the conductors over the full range of their current?

For a fault in the instantaneous range of the curve, AmpSentry will trip in less than a second. However, it does not start regulating fault current for a couple of milliseconds, because it takes time for the excitation system to respond. If you're connecting to a transfer switch served by the utility or the generator set, typically the generator set is going to have a lot less fault current than the utility. If your system is sized for fault current from the utility, you are protected in the event of a fault current from the generator set.

To answer the second part of your question about the trip curve, if the cable is sized for the full rated current of the generator set, you are protected.

Is there a way to prevent ERMS from being left on accidentally?

The ERMS switch has a light that turns on and off for visual confirmation. And the switch position can be monitored or alarmed.

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